A Uniquely Sculptured Middle Miocene Pelecypod of the Genus *Lima*

BY

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(1 Plate)

THIS *Lima* CAME TO MY attention when fragments were found in collections (USGS M3743, M3744, and M6500) from unnamed upper Miocene strata on San Clemente Island, California (VEDDER & MOORE, 1976: plt. 3, fig. 7). To aid in identifying these fragments, J. G. Vedder of the U. S. Geological Survey showed me a specimen, the holotype, which he had collected in 1953 from sandstone beds in the lower part of the Monterey Shale of the San Joaquin Hills, California. He also furnished Holocene specimens of *Lima tetrica* Gould, 1851, which he had collected in the Gulf of California, and I am indebted to him for these courtesies and also to Warren O. Addicott for helpful discussions and for technical review of the manuscript. The photographs that illustrate this paper were taken by Kenji Sakamoto and the electron micrograph by Robert Oscarson, both with the U. S. Geological Survey. Two abbreviations are used in this paper: USGS for U. S. Geological Survey, and USNM for National Museum of Natural History.

Lima vedderi Moore, spec. nov.

(Figures *2*, *6*, *7*, *9*, *10*)

The shell of *Lima vedderi* is moderately thick, and the preserved part bears 20 prominent slightly rounded ribs that are separated by rounded interspaces about half as wide as the ribs of the anterior and posterior margins, but as wide as the ribs on the central part of the shell. Assuming a normal positioning of the beaks, the holotype is about 45mm high and 50mm long. Distinctive bulbous nodes are preserved along the entire length of the surface of the ribs; no part of the ribs is smooth. The nodes are massive and shaped like very shallow cups with their dorsal surfaces (Figure *9*) convex and smooth and their ventral surfaces (Figures *2*, *10*) concave. The nodes are about evenly spaced; the distance between the midpoints ranges from 2.2 to 2.8mm. Although the general configuration of the nodes is regular, some nodes are more nearly semispherical and thicker than others. No minor sculpture similar to that on *L. vedderi* has been noted on any described *Lima*, nor, for that matter, on any other pelecypod genus. The uniqueness of the sculpture makes identification of even small fragments feasible (Figure *6*). The outline, shape, and ribbing of *L. vedderi* are sufficient to make assignment to the genus *Lima* reasonably certain. Holocene specimens of *Lima tetrica* Gould from Baja California, the only similar northeast Pacific species, illustrate comparisons with the fossil species (Figures *1*, *3*, *4*, *5*, *8*). *Lima tetrica* differs from *L. vedderi* in sculpture; the ribs on *L. tetrica* bear spines and lamellae rather than nodes.

Holotype: USNM 240060; Figures *7*, *9*, *10*.

Type Locality: USGS M3220. San Juan Capistrano quadrangle (1949 edition), Orange County, California; 328m N and 91m W of SE corner of sec. 4, T. 7 S., R. 8 W.; altitude about 80m. On east bank of Aliso Creek. Base of Monterey Shale, middle Miocene. Lat. 33°35.3′N, long. 117°47.7′ W. J. G. Vedder, 1953.

Occurrence Elsewhere: USGS M3743, M3744, and M6500, upper Miocene, San Clemente Island, California. (U. S. Geological Survey locality data are on file and available through the Paleontology and Stratigraphy Branch, Menlo Park, California).

Range: Middle to late Miocene.

Mollusks occurring in the San Joaquin Hills collection (USGS M3220) with *Lima vedderi* include *Lyropecten crassicardo* (Conrad, 1857), *Ostrea wiedeyi* Hertlein, 1928, and *Ostrea* sp. cf. *O. freudenbergi* Hertlein & Jordan, 1927. Also in the collection are specimens of the middle Miocene echinoid *Vaquerosella merriami* (Anderson, 1905) and foraminifers that were identified in 1960 by Patsy B. Smith as follows:

Species	Abundance
Marginulina beali (Cushman)	Few
Valvulineria californica appressa Cushman	Very abundant
Valvulineria depressa Cushman	Abundant
Nonion costiferum (Cushman)	Common
Hanzawaia illingi (Nuttall)	Common
Buliminella subfusiformis Cushman	Abundant
Elphidium crispum (Linnaeus)	Rare
Nonionella sp.	Few
Bolivina marginata Cushman	Rare
Fursenkoina californiensis (Cushman)	Common

Smith assigned these foraminifers to the middle Miocene, lower Luisian Stage, and considered them to indicate a water depth of 50 to 150m. Modern representatives of the mollusks *Ostrea* and thick-shelled species of *Lima* live in shallow water at a depth of less than 100m.

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Explanation of Figures *1* to *10*

Figures *1, 3, 4, 5, 8*: *Lima tetrica* Gould, 1851

Figure *1*: Exterior of left valve. About 5km N of Mulege, Baja California, Mexico. USNM 710970 × 1½

Figure *3*: Interior of left valve shown in Figure *1*

Figure *4*: Interior of right valve shown in Figure *5*

Figure *5*: Exterior of right valve paired with specimen shown in Figure *1*. USNM 710971 × 1½

Figure *8*: Exterior of left valve. Punta Pescadero, about 80km SE of La Paz, Baja California. USNM 710969 × 1

Figures *2, 6, 7, 9, 10*: *Lima vedderi* Moore, spec. nov.

Figure *2*: Electron micrograph of specimen shown in Figure *6*. San Clemente Island, California. USGS M6500; USNM 240059 × 13

Figure *6*: Fragment of valve from San Clemente Island, California. USGS M6500; USNM 240059 × 1½

Figure *7*: Holotype. A left valve?; incomplete specimen. USGS M3220; USNM 240060 × 1½

Figure *9*: Enlargement of noded ribs of holotype viewed from dorsal side. × 3

Figure *10*: Enlargement of noded ribs of holotype viewed from ventral side. × 3